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ABSTRACT

Although problems exist in using microcomputers with young children, there are many reasons teachers should encourage the use of microcomputers in early childhood classrooms. Teachers with only one microcomputer can employ the computer as a learning center to be used independently by two children at a time. Using computers in early childhood classrooms will make early childhood teaching a more attractive profession and will provide more access to computers for minorities and girls. The computer will be helpful as a "tutor" to teach students academic skills, as a "tool" for teachers to use in keeping records, and as a "tutee" with which students learn to program. While microcomputers should not be accepted uncritically into classrooms, positive aspects of computers for young children include enhancing self-concept, teaching problem solving, and providing individualized instruction. Negative aspects for young children include a paucity of suitable educational software, the possibility of reducing time parents spend with children, and the increasing gap between the "haves" and the "have nots." Early childhood teachers also need to know about the larger context and effects of microcomputers on society. Teachers must have a role in children's learning about computers, or the marketplace will be the greatest influence on the use of computers by children. (CB)

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SO YOU HAVE ONE COMPUTER? WHAT NOW?

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Role of the Teacher

The learning center approach is perhaps the foremost management tool for the teacher who only has one computer available. Two children can work at the computer with its wonderful interactive possibilities. At the same time, the children will be developing useful social skills. Of course, scheduling is important. The two students may not grow in the socialization area if the software available is "overused." The children need to be equipped with a different software package once bored with the one in current use.

The teacher does not need to be physically present with these two children. The teacher is free to focus attention elsewhere. In this way, the computer serves a different purpose than the teacher. The teacher is a manager of instruction who focuses on language development, social skills, higher conceptual skills, etc.

"Teacher buffs" should be rewarded for learning computer use and sharing their expertise with others. It is important that they are encouraged to continue their involvement because the creator of software will become the creator of curriculum.

Why Should Early Childhood Teachers Know About Computers?

The "Information Society" is here. More than fifty percent of the labor force holds information related jobs. It is predicted by many that seventy-five percent of all occupations will deal with computers in some way by 1985 (Molnar, 1981). "Techtronics" is upon us all. Everything

mechanical will soon become electronic. Before too long we might each have our own LOC (Library of Congress). The microcomputer will be needed to organize, store, and retrieve information.

Early Childhood Teachers know the importance of equality. Do we want the "have's" and "have not's" to be further separated by computer familiarity or lack of it? Early Childhood Teachers know the importance of reducing sexism and racism, yet girls and minorities are having less access (and they are now going into the job market in droves).

Do we want to further decrease the desire to go into education? In 1966, 21% of students entering college wanted to go into teacher education. In 1983, 4.7% wanted to go into teacher education. Prospective teachers will notice if the 325,000 micros in our nation's schools are ignored by early childhood teachers. The number of computers in public elementary and secondary schools has risen from 31,000 in 1981 to 325,000 in 1983 and is expected to double in each of the next five years, reports the National Center for Education Statistics (Bulkeley, 1984).

Early Childhood Teachers need to take leadership in providing instruction with computers. Otherwise, others will take that leadership. Do we want to have overreliance and submission to the "expert?"

How the Microcomputer Can Help an Early Childhood Teacher

The computer will be helpful to teachers and their young students as a tutor, a tool, and a tutee (Taylor,

1980). The computer can assist and help manage instruction. That is, the computer can be a TUTOR. Commercial programs can be selected, evaluated, and used. Or, teachers can write their own programs. PILOT (Programmed Inquiry, Learning Or Teaching) is a good authoring language which a teacher can use to write short instructional programs. Good software can help develop ability in readiness skills (including attention span), language arts, and social studies.

The computer can be a general purpose TOOL. It can be used for wordprocessing or information management (examples are date on student background, health services, evaluations, food services, attendance, social services, parent participation). Music and art can be produced with the computer.

The computer can be a tool for teaching programming in a child oriented computer language such as Logo. In this sense, the computer is a TUTEE. The child programs the computer in a high level, interactive, "natural" language. (It is English language oriented.) Logo is "user friendly" and procedural.

Other areas of helpfulness include the uses as a prosthetic device for the handicapped child and an enrichment device for the gifted young child.

Do We Need to Guard Against Uncritical Acceptance?

Quality teacher training is necessary to guard against uncritical acceptance of ideas and promises about computers and children (Clements, 1982). How can computer

programming restructure the way children think, as the Logo people argue? Piaget's theory states that children's thinking develops according to fixed biological laws in conjunction with, but never determined by, interactions with the environment. Images on the screen are two dimensional. Don't young children learn with three dimensional, "hands-on" manipulatives?

The computer in Early Childhood settings must be in the context of the curriculum, of psychological characteristics and capabilities of the children, and of previous experience. And the question needs to be asked: Is the computer detracting from normal activities like play and physical interactions with the environment?

Positive Aspects of Computers for Young Children

Few would deny that children are often fascinated, interested, and motivated by computers. This involvement and sense of power when controlling the machine serve to enhance self-concept. There is enjoyment in the complexity and challenge. And one doesn't always need an adult teacher immediately present when using the computer.

Problem solving is learned. Problems are broken down into smaller, solvable steps. The concept of "debugging" can be applied to any skill the child wishes to learn. Eventually the concept of "failing" at an activity will be meaningless to the child. Success, not failure, will be experienced. Reinforcement comes from actually making something happen. The feedback is immediate so that the effect of one's work is seen as soon as it is done. "Errors" and unsuccessful

performance are occasions for learning rather than simply evidences of failure.

Individual differences are addressed as lower functioning students are "captivated" and higher functioning students are challenged. The potential exists to close the gap between the "haves" and the "have nots." Other positive aspects include the development of "delay of gratification" (the reward comes at the end) and choices are made plentiful with computers. Parents who buy computers for the home are spending more time with their children due to the children's fascination.

Negative Aspects of Computers for Young Children

Available software is often of questionable educational value. There is a paucity of research and development for this software. Most of this software unfortunately provides a printed display as the most frequent form of a computer response. But most preschoolers can not read. And much of the software makes the computer an automated page turner -- like a pack of flash cards with no effort at feedback other than number correct or wrong.

Young children do not have fully developed motor skills, particularly eye-hand coordination. Their reaction time is slow. Yet, many computer games require manual dexterity, quick judgement, and quick reaction time. Many of the available programs require the use of many different keys in complex ways. This is the "typing problem."

Other negative aspects include the existence of a sexual bias. The games are more boy-oriented with the

aggressive component. Also, boys are more adept at the spatial qualities required in the games. There may be a lack of direct social and physical experience with the "real world" during the absorbing "machine time." Machine time grows to swallow up waking hours (and much sleep). There is a potential for reducing communication between parents and children.

Mothers are already away from the home more these days. Almost one-half of this country's mothers work outside the home. Computers will have a major impact on children's use of time in the home. Will the computer be another babysitter detracting from mother/child interaction?

Although computers have the potential to reduce the separation between the "have's" and "have-not's", they also might serve to further separate these two groups. Many urban and rural area schools do not have the money to provide enough computers, software, or peopleware. Therefore, it is even more important that teachers provide computer time for students from various backgrounds, even if only one computer is available.

Early Childhood Teachers Need to Know Something About the Larger Context and Effects of Microcomputers on Society

There are four types of computers. The Apple IIe is an example of a microcomputer. A minicomputer might be found in a small research lab. Mainframe computers are large and expensive ($500,000 to $4 million) and are used by banks, universities, and government installations. Supercomputers are capable of "number crunching" like with weatherforcasting.

The primary components of most computer systems

follow. The CPU is the central processing unit. The storage contains the program and data. Auxilliary storage is an extension of the memory. Input devices include keyboards, joysticks, track balls, and graphic tablets. Output devices include a monitor screen and printer. Software is the collection of programs used to control the computer. "Floppy" disks (diskettes) are "soft" in comparison to the "hard" keyboard, monitor, and disk drive.

A brief history follows. Computing devices have existed for centuries. For example, Stonehenge is very old. In 1833, Charles Babbage created a steam driven device he called an analytical engine. In 1946, a huge electronic computer with vacuum tubes was developed with federal monies -- ENIAC. The microprocessor chip, silicon coated with crystal, was produced in 1971. The microcomputer revolution had begun.

A microcomputer works based on an "On-Off" principle. A light switch, for example, is either on or off. Each little pathway etched on the small chip has recorded an "on" or "off" according to which way the electrons flowed through it. It is that simple. In a way, the computer is only a high speed moron. It can only represent two entities -- on and off or zero and one. The letter "A" for example is represented in computer memory by 0's and 1's. The base two numerical system (a binary system) is used. In terms of place value, nine ones can not exist in the ones' place. Each place can be occupied by no more than 1; Whereas, a 9 can be used when base ten is used.

What is programming? It is the step by step

instructions to the computer. The computer operates sequentially. The following is an example of a program for how a washing-machine works:

```
WASHING-MACHINE
  Fill tub with wash water and soap
  Agitate
  Drain wash water
  Fill tub with first rinse water
  Agitate
  Drain first rinse water
  Fill tub with second rinse water
  Agitate
  Drain second rinse water
  Spin dry
END WASHING-MACHINE
```

Microcomputers are evident today throughout society. Embedded computers control time and temperature in a microwave oven, in automobile engines, in televisions and stereos, in cameras, in telephones, in automatic thermostats, in hand held calculators, and in electronic games. Computers are used in homes for wordprocessing, record keeping, home finances, and controlling home appliances. Telecommunications are evidenced by electronic bulletin boards, electronic mail, teleconferencing and electronic shopping and banking.

Artistic uses include graphics, light pens, three dimensional images, animation, and special effects (Star Wars.) Some medical uses are collecting medical histories,

portable patient monitoring, automating laboratory procedures, and computer assisted diagnosis. Transportation is served by computerized traffic control, computers in cars, airline reservations, computer scheduled buses, and air traffic control.

Conclusion

The children of today will be citizens of the twenty-first century. They will need to develop confidence with computers and their teachers have a definite role in this process. If the teachers do not get involved, then the marketplace will be the greatest influence. Thirty percent of 1983's $94 million home education software market was spent for children under seven, and that volume will double in 1984 (Bulkeley, 1984). The reason for these sales is most likely that older children need programs on specific subjects -- say, fractions-- meaning a narrower market and lower sales.

Teachers need to be help manage computer time for children. Teachers need to know about computers and how they can help children and themselves personally and professionally. Uncritical acceptance is dangerous. Many computer programs are violent or punish failure with flippant error messages such as "you turkey". Some programs are too fast or too dull.

Computers are part of the lives of children and their teachers today and particularly tomorrow. If for no other reason, they can serve to provide socialization moments between children and open up time for our young ones in the laps of their parents.

REFERENCES

Bonner, P. "Computers in Education: Promise and reality." Personal Computing, September, 1984.

Bulkeley, W. "Computer software for younger children garners big share of home education sales." The Wall Street Journal, p. 27, August, 1984.

Clements, Douglas H. "Microcomputers in early education: Rationale and outline for teacher training." Kent, Ohio, 1982, p. 7. (ERIC Document Reproduction Service No. ED 223 358)

Molnar, A. "The coming of computer literacy: Are we prepared for it?" Educational Technology, 1981, 21 (1), 26-28.

Taylor, R. (Ed.). The Computer in the School: Tutor, Tool, and Tutee. New York: Teachers College Press, 1980.